

to preempt state regulation over intrastate interconnection rates so long as it is "possible" to separate the costs of interstate traffic from intrastate traffic or unless intrastate rates were "so high as to effectively preclude interconnection."<sup>145</sup>

This dual approach to the regulation of interconnection rates was also applied to the exchange of traffic between LECs and CMRS providers. The Commission has consistently refused to become involved in LEC-CMRS intrastate interconnection rate issues because the underlying costs of interconnection were segregable and because LEC rates were not so high as to effectively preclude interconnection altogether.<sup>146</sup>

Congress fundamentally changed the regulatory framework for CMRS in 1993 when it added Section 332(c)(3) to the Communications Act. This provision specifies that "no state or local government shall have any authority to regulate the entry of or the rates charged by any commercial mobile service" although they may continue to regulate "other terms and conditions" of CMRS service. As a result, States clearly no longer have the authority to regulate "the rates charged by" any CMRS provider.<sup>147</sup>

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<sup>145</sup> RCC Declaratory Order, 2 FCC Rcd 2910, 2912 at ¶¶ 15 and 18 (1987).

<sup>146</sup> See, e.g., FCC Policy Statement on Interconnection of Cellular Systems, 59 R.R.2d 1283, 1284 (1986); RCC Declaratory Order, 2 FCC Rcd 2910, 2911-12 at ¶¶ 12, 15 and 18 (1987); RCC Declaratory Reconsideration Order, 4 FCC Rcd 2369, 2372 at ¶ 25 (1989). See also Indianapolis Telephone Co. v. Indiana Bell, 1 FCC Rcd 228 (1986), *aff'd*, 2 FCC Rcd 2893 (1987)(dismissing complaint involving intrastate interconnection charges only).

<sup>147</sup> Section 332(c)(3) specifies certain circumstances when the States can petition the FCC to regulate CMRS rates, although the FCC has rejected the petitions filed to date because of their failure to meet this statutory standard. See, e.g., Arizona Rate Petition Order, 10 FCC Rcd 7824 (1995); Louisiana Rate Petition Order, 10 FCC Rcd 7898 (1995). There is considerable evidence that the term "rates" in Section 332(c) refers to the retail rates CMRS providers charge their end-user customers and does not include interconnection rates they charge other carriers. See, e.g., Section 332(c)(3)(A)(i)(permitting states to petition for authority to regulate rates if "market conditions with respect to [CMRS] services fail to protect

Certain CMRS providers have now (three years later) urged this Commission to expand this Congressional preemption over CMRS rates to include the interconnection rates LECs charge CMRS providers. However, this argument is not supported by — and, indeed, is inconsistent with — the statutory language. Section 332(c)(3) preempts only “rates charged by” — not rates charged to — CMRS providers. This argument is also incompatible with the Commission’s consistent interpretation of Section 332(c)(3).<sup>148</sup>

In summary, preemption of LEC-CMRS interconnection rates cannot be justified under the 1993 amendments to the Communications Act. Besides, as discussed in the preceding section, the issue of state-federal jurisdiction over LEC-CMRS interconnection rates has now been addressed in the Telecommunications Act of 1996.

#### **V. CMRS-IXC AND LEC TRANSIT OF CMRS-IXC INTERSTATE INTERCONNECTION ISSUES**

The Commission tentatively concludes that CMRS providers need “certain protections” with regard to interstate traffic they deliver to or receive from IXCs.<sup>149</sup> Among other things, it tentatively concludes that CMRS providers “should be entitled to recover

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subscribers”). However, this interpretation question concerning the 1993 Amendments has become academic with the enactment of the 1996 Act. The new Act makes clear that interconnection rates (including the rates charged by CMRS providers to LECs) are to be negotiated and submitted to state commissions for approval.

<sup>148</sup> In 1994, the FCC held that “we continue to believe that LEC costs associated with the provision of interconnection for interstate and intrastate cellular services are segregable, and, therefore, we will not preempt state regulation of LEC interconnection rates . . . .” Second CMRS Report, 9 FCC Rcd 1411, 1498 at ¶ 231 (1994). Last year, the FCC reaffirmed that state “regulation of the interconnection rates [charged] by landline companies to CMRS providers appears to involve rate regulation only of the landline companies, not the CMRS providers, and thus does not appear to be circumscribed in any way by Section 332(c)(3).” Louisiana Rate Petition Order, 10 FCC Rcd 7898, 7908 at ¶ 47 (1995).

<sup>149</sup> See Notice at 56 ¶ 115.

access charges from IXC's," although the Commission asks whether it should dictate these charges or rely instead on market forces.<sup>150</sup>

U S WEST demonstrates below that CMRS providers do not need special protection in connection with their IXC traffic because they possess an "access bottleneck;" and that regulatory intervention into CMRS-IXC interconnection is unnecessary because carriers have an incentive to connect with each other. CMRS-IXC interconnection is a subject this Commission should reserve for its complaint jurisdiction.

**A. U S WEST's Current Interstate CMRS-IXC Transit Charges Are Reasonable**

This section responds to the Commission's request for a summary of existing compensation arrangements employed when a LEC network is used to transport interstate traffic between a CMRS provider and an IXC.<sup>151</sup> This discussion confirms that U S WEST's "transit" function charges are reasonable.

When an IXC chooses to use U S WEST's network to connect to a CMRS provider, whether to originate or terminate its traffic, U S WEST charges the IXC for its transiting function and charges CMRS providers nothing. It is appropriate for U S WEST to impose a recurring charge because its network is being used to transport communications between carriers. It is also appropriate for U S WEST to charge IXC's rather than

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<sup>150</sup> *Id.* at 56-57 ¶¶ 115-17.

<sup>151</sup> *See id.* at 56 ¶ 115.

CMRS providers for this function because it is the IXC which chooses to use U S WEST's network (as opposed to utilizing other alternatives).

U S WEST's transit charges to IXCs are based on certain recurring rate elements contained in its interstate switched access tariff. U S WEST's transit charges include two rate elements — transport (from the IXC POP to the CMRS POP) and tandem switching — to reflect the actual use of its network. U S WEST's IXC transit charges do not include other rate elements like local switching and carrier common line charges because the costs associated with those charges are not incurred in performing the transit function.

The Commission needs to be aware that IXCs have competitive alternatives to U S WEST's network and its switched access transit services. IXCs can bypass U S WEST's network altogether by installing their own facilities (wire, fiber, or microwave) to the CMRS provider's network or by using the transit services of a competitive access provider ("CAP"). Alternatively, IXCs can purchase a private line from U S WEST's special access tariffs to avoid the MOU charges U S WEST imposes for use of its tandem switch.<sup>152</sup>

IXCs and CMRS providers are pursuing these alternatives with increasing frequency. One prominent CMRS provider recently advised the Commission that, based

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<sup>152</sup> Given the availability of these alternatives, it may no longer be appropriate to say that IXC calls destined to CMRS providers "typically" are transported through a LEC. *See Notice* at 56 ¶ 115. Given Section 705 of the 1996 Act, 47 U.S.C. § 332(c)(8), it should be anticipated in the near future that most interstate CMRS-IXC traffic will involve direct CMRS-IXC connections. There is, therefore, no basis for the Commission's conclusion that "most CMRS providers are likely to depend on LECs for interconnection of interexchange traffic to IXCs." *Notice* at 56 ¶ 115.

upon its experience, CAPs “are eager to fill their newly established networks with high volume trunked traffic such as that leaving cellular switches.”<sup>153</sup> It is U S WEST’s understanding that a major IXC is incenting new PCS licensees to deliver all of their traffic to the IXC, including traffic destined for other IXCs.

Given these competitive alternatives, there is no reason for the Commission to become involved with, much less regulate, the rates charged by, LECs for their CMRS-IXC transit functions. The existence of alternatives to a LEC’s transit functions imposes on LECs the “pricing pressures of a competitive market.”<sup>154</sup> If a LEC charges too much for its transit services, IXCs will simply pursue one of their many alternatives.<sup>155</sup>

U S WEST must disagree with the Commission’s characterization that, in performing a transit function, a LEC is suddenly engaged in “the joint provision of interstate access service” with a CMRS provider.<sup>156</sup> Two discrete functions are being performed on CMRS-to-LEC-to-IXC calls: the CMRS carrier provides access, and the LEC provides transport. Particularly given the transport alternatives available to an IXC, it would be inappropriate for the Commission to require two different (and sometimes competing) companies performing different functions to offer a joint (*a.k.a.* bundled) “access + trans-

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<sup>153</sup> AirTouch Comments, Docket No. 94-54, at 7-8 (June 14, 1995).

<sup>154</sup> *Ibid.*

<sup>155</sup> Indeed, Commission attempts to decrease the rates charged by LECs for their transit functions will stymie the development of a competitive market because low rates will discourage entry (much like subsidized local residential rates are posing such a problem in opening the local loop to competition).

<sup>156</sup> See Notice at 56 ¶ 115.

port” package. In competitive markets, the requesting carrier assumes the responsibility for establishing the business arrangements for originating and terminating its traffic, and those arrangements may involve agreements with more than one carrier.

**B. CMRS Providers, Like All Other Local Providers, Possess an Access Bottleneck**

The Commission is correct in observing that CMRS providers “lack market power with respect to end users” but possess “some market power over IXCs that need to terminate calls to a particular CMRS provider’s customer.”<sup>157</sup> Like all other carriers serving end users, CMRS providers possess an “access bottleneck.”

Interconnection is essential in a multi-carrier environment. Without interconnection, end users would be required to purchase service from every exchange carrier to be assured of having access to all other persons. For example, without interconnection, John, Sally, and Tim would have to subscribe to the same carrier to be able to call each other; however, they would be unable to call Mary if she were served by a different carrier.

It is unreasonable to require people to subscribe to multiple carriers, and it is precisely for this reason that the Communications Act of 1934 required, and continues to require, interconnection “upon reasonable request.”<sup>158</sup> While end users can choose their

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<sup>157</sup> *Id.* at 57 ¶ 117.

<sup>158</sup> *See* 47 U.S.C. ¶ 201(a)

serving local carrier, they do not decide which carriers interconnect with their serving carrier; interconnection decisions are made by carriers, not consumers.

This power to decide with whom one interconnects is called an “access bottleneck” because accessing a local carrier may be the only way other carriers (and their customers) can reach end users served by the local carrier. It bears emphasis that an “access bottleneck” exists regardless of which carrier provides access, regardless of the size of a carrier, and regardless of the technology used by that carrier. John cannot call Mary if they are served by different CMRS providers and if the two CMRS providers are not connected to each other — whether directly or indirectly through other carriers.

Given this “access bottleneck,” CMRS providers do not need Commission intervention to receive access charges from IXC; they can and do impose such charges today if they choose.<sup>159</sup>

### **C. Commission Intervention Into CMRS-IXC Interconnection Is Unnecessary**

It might be tempting for regulators to conclude that intervention is necessary if all carriers serving end users possess an “access bottleneck.” In fact, such intervention is unnecessary and would be counterproductive.

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<sup>159</sup> The financial arrangements between CMRS providers and IXCs is not generally publicly available. However, before the enactment of the 1993 Budget Act, cellular carriers in Arizona were required to tariff their exchange access service rates. Metro Mobile, a cellular carrier serving a large portion of Arizona, apparently charged IXCs no access charges (originating or terminating) for traffic involving its customers when located in Phoenix and Tucson and 8¢ per minute for traffic involving its customers when located in other Arizona markets. See Metro Mobile CTS of Phoenix, Inc., Tariff A.C.C. No. 2, p. 18, § 6.3.2 (effective June 30, 1993).

Regulatory intervention is unnecessary because carriers have an incentive to interconnect with other networks. The greater the number of interconnections, the greater the number of people one's customers can reach through one's service, and the more valuable one's service becomes. A carrier serving 10,000 customers has a more valuable service if its customers can call not only each other but also the millions of people served by other carriers.<sup>160</sup>

There always remains a risk that a carrier may attempt to extract unreasonably high prices for the privilege of accessing one's network, with the threat that interconnection will be denied if the high prices are not paid. This risk is more theoretical than real, however. First, interconnection is beneficial to both carriers; each improves the value of its own service by interconnection.<sup>161</sup> Second, in a "network of networks," a denial of direct interconnection rarely results in a denial of interconnection altogether; carriers can often reach another carrier indirectly, through another carrier.<sup>162</sup>

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<sup>160</sup> Obviously, a carrier serving one million subscribers has less of an incentive to interconnect with a carrier serving 10,000 subscribers than *vice versa*, although large carriers always have an incentive to interconnect because their subscribers will want to make calls to people served by small carriers. However, this difference in need for interconnection explains why, in fully competitive markets like the Internet (see Attachment B), carriers of different sizes generally use asymmetrical interconnection compensation arrangements.

<sup>161</sup> However, rarely is interconnection equally beneficial. The Internet discussion above confirms the economic theory that smaller carriers obtain more value from interconnecting with a large carrier than *vice versa*.

<sup>162</sup> U S WEST has seen this occur with traffic between CMRS providers and independent telephone companies ("ITCs"). Some ITCs impose high interconnection charges for terminating toll traffic. To avoid these charges, CMRS providers often haul what would otherwise be a toll call over their own network and then deliver to U S WEST what appears to be a local call, which U S WEST then forwards to the ITC.



Third, the availability of the regulatory complaint procedure, coupled with the interconnection and nondiscrimination obligations of the Communications Act, acts to restrain attempts to impose unreasonable charges. Finally, and perhaps most importantly, is the pressure imposed by the market itself. If a carrier's subscriber cannot reach a desired person, or must pay a high price for the call (because of the interconnection charges imposed by the subscriber's local carrier), the subscriber will switch to another serving carrier.

## **VI. CONCLUSION**

Commissioner Ness has observed that, in considering LEC-CMRS interconnection issues, the Commission "must not throw caution to the winds":

We must proceed in a manner that is consistent with the law and that will be perceived as fair. We must not abridge the LECs' legal or equitable rights, distort marketplace incentives for CMRS providers, or cause prices for other customers to increase.<sup>163</sup>

These objectives will not be achieved if the Commission adopts its radical "free interconnection" policy for one industry segment: CMRS providers. What is needed is a transition plan for all telecommunications carriers, not an interim plan for one segment of the industry.

For all the foregoing reasons, the Commission should focus its finite resources on completing the new Section 251(d) local interconnection and access reform rulemakings

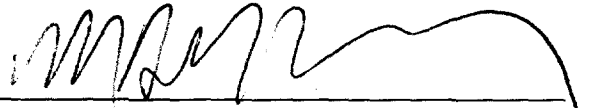
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<sup>163</sup> Separate Statement of Commissioner Susan Ness, at 2.

and, in the process, develop interconnection/access policies for all telecommunications carriers. It would be imprudent and unwise to adopt an interim plan for one segment of those interconnectors (*i.e.*, LEC-CMRS), and adoption of "bill and keep" would be unlawful.

Respectfully submitted,

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March 4, 1996

U S WEST Comments  
CC Docket No. 95-185  
March 4, 1996

ATTACHMENT A

**A Response to Dr. Gerald Brock  
by  
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and  
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**A. INTRODUCTION**

Several companies (Comcast, Cox and Teleport) have retained Professor Gerald W. Brock to prepare a series of papers on the economics of interconnection. Two of these firms (Comcast and Cox) and the Cellular Telecommunications Industry Association have submitted Dr. Brock's papers to the FCC in support of the proposition that "sender keep all" or "bill and keep" is "a logical compensation arrangement."<sup>1</sup>

The FCC discussed and cited Dr. Brock's findings extensively in the Notice of Proposed Rulemaking (NPRM) released in CC Docket No. 95-185.<sup>2</sup> Unfortunately, the authors of the NPRM were sufficiently impressed with Dr. Brock's analysis to tentatively propose "bill and keep" as an interim method for compensation between local exchange carriers (LECs) and providers of commercial mobile radio services (CMRS). Dr. Brock claims that "bill and keep" is the economically rational way to price interconnection services if "traffic flows are very

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<sup>1</sup> Gerald W. Brock, *The Economics of Interconnection*, (prepared for Teleport Communications Group) March 1995, preface.

<sup>2</sup> See *Interconnection Between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, FCC 95-505, Jan. 11, 1996, pp. 17-19, ¶¶ 32-36.

roughly balanced among the companies,” or if “[t]he cost to a company of terminating traffic is low in relationship to the transactions costs of measuring and charging for traffic.”<sup>3</sup>

In this report, I will show that Dr. Brock’s papers contain fatal flaws in logic, misrepresentations of the positions of other economists and misstatements of fact regarding interconnection arrangements and Internet interconnection pricing. Hence, the Commission should not rely on either Dr. Brock’s conclusions or the premises on which they are based. Instead, the Commission should recognize the wide body of established economic opinion and authority that interconnection arrangements should be reached through negotiations between and among interconnecting carriers and interconnection prices should both cover the incremental costs of interconnection services and contribute to the common costs of the public switched telecommunications network (PSTN).

In Part B of this report I will rebut Dr. Brock’s contention that “bill and keep” is an economically rational way to price interconnection between two networks “[i]f traffic is roughly equal in both directions between the two networks...”<sup>4</sup> As Dr. Brock admits, traffic flows between LECs and CMRS carriers are not even close to being balanced, nor will they be anytime soon. Moreover, “bill and keep” is a wrongheaded interconnection pricing policy even if traffic is balanced between carriers. First, there is no way of knowing, in advance, whether or not it will be balanced. Second, setting the price of anything below its cost – including interconnection – creates an incentive to overuse it. Third, even if traffic is balanced, that does not mean the costs of interconnection are balanced. Fourth, “bill and keep” ignores the fact that there are many different technical types of interconnection among carriers: most CMRS interconnections are quite different from, and more costly than, IXC interconnection. Given

<sup>3</sup> Gerald W. Brock, *Price Structure Issues in Interconnection*, (prepared for Teleport Communications Group) March 30, 1995, pp. 3-4.

<sup>4</sup> Gerald W. Brock, *Price Structure Issues in Interconnection*, (prepared for Teleport Communications Group) March 30, 1995.

that the type and cost of interconnection differs across carriers, it does not make sense to charge the same price – much less a zero price – for different services.

Given the role of pricing in a market economy, it is not surprising that one does not observe “bill and keep” as a means of payment in competitive industries. Even the oft-cited LEC-LEC pricing of call termination in adjacent service areas is not actually a “bill and keep” arrangement: it is a negotiated method of sharing the costs of interchanging traffic, with parties contributing to costs in rough proportion to the flow of traffic and costs of termination. Thus, in Section C, I will explain why “bill and keep” is not used in other industries with analogous needs for interconnection.

In reaching his “sender keep all” recommendation, Dr. Brock relies heavily on third-party sources for the “factual” foundation underlying his conclusion. Specifically, he relies on two studies contained in a book he edited recently, one on the Internet and the other an interconnection pricing analysis originally commissioned by the European Commission. Regarding Internet pricing, cited by Dr. Brock as an example of “bill and keep,” he is wrong on several counts, as I will explain in Section D. In Part E, I will show that Dr. Brock has taken key recommendations from the EC study out of context. The effect of his selective quotation is to fundamentally misrepresent the main conclusions of the authors of the report.

Dr. Brock also relies on his interpretation of an incremental cost study of urban exchanges in California, the Mitchell/RAND study. In Section F, I will show that Dr. Brock is incorrect in inferring that incremental cost estimates from this study of local exchange service are reasonable approximations of CMRS-wireline interconnection costs. He is completely ignoring the fact that there are many different types of interconnection services being used by carriers today and the cost of the Type 2A interconnection services provided to CMRS by LECs is much higher than he claims. In the section G, I recommend that the Commission hold off on adopting an interim CMRS interconnection regime and allow the current, negotiated

agreements to stand for the next six months until the Commission has a chance to develop generic interconnection and access charge rules. Section H is my biography and qualifications

**B. BILL AND KEEP IS UNECONOMIC EVEN IF TRAFFIC IS BALANCED**

The central tenet of economics is that prices play a critically important role in the allocation and distribution of goods and services in a market economy (hence the name of a key body of economics, "price theory"). As a means of payment for the provision of services among competitors "bill and keep" (by any name, "sender keep all," "mutual traffic exchange" or "payment in kind") violates that principle. The centrality of prices in markets is emphasized by the idea that the prices of services should at least cover their total service long run incremental costing (TSLRIC). In my view, it is inconsistent for anyone to stress the importance of costs in pricing, then advocate that interconnection services ought not be priced at all. Surely a zero price violates the standard of TSLRIC.

Bill and keep does not provide incentives for wireless carriers to reduce costs of wireline termination. The argument that "sender keep all" allows LECs and cellular carriers to perceive the best incentives to reduce costs makes no sense. Requiring LECs to give away their services to CMRS carriers provides NO incentive for CMRS carriers to reduce the cost of terminating their customers' calls on the LEC's network. The whole point of setting prices at or above costs in a market economy is that people should pay for what they use. The "sender keep all" proposal is a transparent effort by cellular carriers to enjoy the benefits of an "in-kind exchange" of services of decidedly unequal value.

For an "in-kind exchange" to be fair to both parties, the costs borne by each party should be at least roughly equivalent. That is certainly not the case here. For the foreseeable future, LECs will continue to serve the highest cost landline customers. Hence, even if the volume of traffic exchanged is equal (and we know it will not be), the cost of providing the ubiquitous network to terminate CMRS traffic will not be remotely equal. Since CMRS providers and their

customers benefit tremendously from the ability to make and receive calls from the millions of customers served by the PSTN, they should pay prices that cover incremental costs and contribute to the common costs of the PSTN.

### C. BILL AND KEEP IS NOT USED IN OTHER INDUSTRIES

Dr. Brock states that “[o]ne important goal of regulation is to bring the results of a monopolized or partially monopolized market closer to what would occur under competitive conditions. Thus, in considering the desirable price structure for regulated interconnection, the expected price structure under full competition is a useful guide.”<sup>5</sup> This is a proposition upon which almost everyone would agree,<sup>6</sup> but it leads to a rejection of “bill and keep”, because “bill and keep” is without empirical foundation in a market economy.

There are countless instances in which two businesses provide services to each other. In most cases, businesses price those services and collect payments based on the actual volume of services provided, just as they would for any other customer. In a few cases — when bartering is involved — firms trade services in kind, without exchanging monetary payments. Even then, the firms keep an account of what has been provided by each party to the exchange, so each party knows what is “owed” the other party. In other words, “sender keep all” [of the kind proposed by Dr. Brock] is not observed as a business practice in competitive industries.

Nor is an equivalent method of reciprocal compensation used in any other regulated network industry, so far as I know. Railroads, for example, interchange carloads with each other by the thousands, but they do not assume their traffic interchange will be balanced or the costs of

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<sup>5</sup> Gerald W. Brock, *The Economics of Interconnection*, (prepared for Teleport Communications Group) April 1995, p. i.

<sup>6</sup> Indeed, the FCC has stated, “As with other areas of common carrier policy, we adopt policies that are intended to create or replicate market-based incentives and prices for both suppliers and consumers.” *FCC Notice of Proposed Rulemaking*, CC Docket No. 95-185, Jan. 11, 1996, p. 4 ¶ 4.

interconnection equal. Instead, they negotiate interchange rates, effectively pricing the services they provide for each other. So too do financial services firms for accepting each others payment instruments (e.g., credit cards, checks, and electronic funds transfers).

The Society for Worldwide Interbank Financial Telecommunications (SWIFT) which provides electronic funds message transfer services is an excellent example of how competitive interconnection services are priced in the private market place. "This private system, controlled by and for the members, allows member banks to bypass the more expensive, inefficient, and often government-controlled telex systems."<sup>7</sup> SWIFT charges a one time initiation and equipment installation fee to new member banks.<sup>8</sup> Additionally, SWIFT charges its members a volume-sensitive usage fee for each message processed, based on the length of the message, and its urgency.<sup>9</sup> SWIFT provides an efficient means of charging banks for terminating funds transfer messages with other banks. It is NOT "bill and keep."

Dr. Brock's assertions about bill and keep notwithstanding, the railroad and banking examples are not exceptions to the rule. In all of the industries I have studied, not once have I observed the equivalent of "bill and keep" arrangements: firms price the services they sell to each other to avoid the problems of bill and keep: opportunistic cost-avoidance, cost-shifting and cost-under-recovery. For those same reasons, "bill and keep" should not be employed as a means of "compensation" for interconnection services in telecommunications.

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<sup>7</sup> The Payments System Committee of the Bankers Roundtable, *Banking's Role in Tomorrow's Payments System*, Vol. II, June 1994, p. 55.

<sup>8</sup> Association of Reserve City Bankers, *Report on the Payment System*, 1982, pp. 143-144.

<sup>9</sup> The Payments System Committee of the Bankers Roundtable, *Banking's Role in Tomorrow's Payments System*, Vol. II, June 1994 pp. 56-57.



**D. BILL AND KEEP IS NOT COMMONLY USED ON THE INTERNET**

According to Dr. Brock, "[t]he best existing example of interconnection under competitive conditions without regulation is the interconnection of commercial providers of Internet services."<sup>10</sup> Relying on another study contained in the book he edited, Dr. Brock represents to the FCC:

"Commercial Internet service providers [ISPs] agreed that interchange of traffic among them was of mutual benefit and that each should accept traffic from the other without settlements payments or interconnection charges."<sup>11</sup>

Based on this factual representation, Dr. Brock concludes: "The Internet example suggests that 'sender keep all' interconnection arrangements are likely to develop in competitive communications markets as the compensation method for mutually beneficial interconnection arrangements."<sup>12</sup> However, the Internet study in Brock's book noted that only voluntary members of the Commercial Internet Exchange (CIX) exchanged traffic at the CIX router without settlements; it does not state that most Internet networks and providers interconnected without interconnection charges. The CIX no-settlement exchange is the only Internet example I am aware of where traffic exchange occurs without settlement. Indeed, because of the overuse and congestion on the Internet, even that limited instance of "settlement free" pricing will soon be history – evidence that "bill and keep" is an uneconomic means of pricing precisely because it removes the incentive to conserve scarce resources.

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<sup>10</sup> Gerald W. Brock, *The Economics of Interconnection*, undated, p. i.

<sup>11</sup> *Id.* p. ii, citing Padmanabhan Srinagesh, "Internet Cost Structures and Interconnection Agreements," in Gerald W. Brock, editor, *Toward a Competitive Telecommunications Industry: Selected Papers from the 1994 Telecommunications Policy Research Conference* (Lawrence Erlbaum Associates) 1994, p. 251.

<sup>12</sup> *Ibid.*

More generally, Dr. Brock is wrong in asserting that commercial Internet service providers interconnect without settlements payments or interconnection charges. As other economists familiar with the Internet have stated, "nearly all users face the same pricing structure for Internet usage. A fixed bandwidth connection [is] charged an annual fee, which allowed for unlimited usage up to the physical maximum flow rate (bandwidth)."<sup>13</sup> Dr. Brock is therefore wrong in asserting that ISPs exchange traffic for free. As documented in another attachment to U S WEST's comments to the NPRM, Internet providers utilize asymmetrical compensation arrangements in which networks which occupy a lower level position on the Internet hierarchy pay higher level networks for the privilege of interconnection: "Money flows upwards: Each level pays the next for connectivity and, occasionally, usage."<sup>14</sup> Hence, the interconnection of ISPs is indeed based on the operation of competitive, unregulated markets. To the extent the FCC "adopt[s] policies that are intended to create or replicate market-based incentives,"<sup>15</sup> the Internet example suggests that it should adopt rules that will encourage the negotiation of mutual compensation arrangements among interconnecting carriers.

#### **E. BROCK MISREPRESENTS THE EUROPEAN COMMISSION STUDY**

In 1994 the European Commission released a study it had commissioned from several noted American and European telecommunications economists about interconnection pricing and universal service issues in an increasingly competitive telecommunications industry.<sup>16</sup> These same experts summarized their study for publication in the book Dr. Brock edited.<sup>17</sup>

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<sup>13</sup> Jeffrey K. MacKie-Mason and Hal Varian, *Economic FAQs About the Internet*, Aug. 21, 1994, p. 8.

<sup>14</sup> Kenneth Hart, "Internet Providers Want Body to Manage Growth," *Communications Week International*, Sept. 1, 1995.

<sup>15</sup> *FCC Notice of Proposed Rulemaking*, CC Docket No. 95-185, Jan. 11, 1996, p. 4 ¶ 4.

<sup>16</sup> See J. Ambak, B. Mitchell, W. Neu, K. Neumann, and I. Vogelsang, *Network Interconnection in the Domain of ONP: Study for DG XII of the European Commission* (prepared for Brussels: European Commission, "EC Study") 1994.

Brock misrepresents the main conclusion of the European Commission study, by stating that:

“The [Arnbak, Mitchell, Neu, Neumann and Vogelsang] study found that continued regulatory oversight of interconnection conditions would be necessary in order to allow effective competition to flourish. It recommended that interconnection rates be based on cost [emphasis added] and set as a capacity charge... In order to apply the principal of setting interconnection charges at the incremental cost of capacity required to terminate the traffic, [emphasis added] it is necessary to estimate that cost.”<sup>18</sup>

Surely Professor Brock understands the fundamental difference between setting prices “at cost” and setting them “based on cost,” as the European Commission study recommends.

Brock goes on to conclude that the principles developed in the study “are applicable to the U.S. telecommunications market as well.”<sup>19</sup> In so doing, Dr. Brock neglects to mention in his paper that the portion of the EC Study from which he quotes was discussing theoretical pricing models — not the authors’ policy recommendations. In fact, the authors stated in the theoretical portion of their study which appeared in Brock’s book:

“Concluding from these observations:

1. We call for cost-based interconnection charges (based on  $MC_{IX}$  or  $AIC_{IX}$ ).
2. We believe that cost-based charges should form the base-line but that mark-ups above  $MC_{IX}$  or  $AIC_{IX}$  may be justified depending on the incumbent’s legitimate revenue requirements.”<sup>20</sup>

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<sup>17</sup> See B. Mitchell, W. Neu, K. Neumann, and I. Vogelsang, “The Regulation of Pricing of Interconnection Services,” in Gerald W. Brock, editor, *Toward a Competitive Telecommunications Industry: Selected Papers from the 1994 Telecommunications Policy Research Conference 95* (Lawrence Erlbaum Associates, “EC Summary”), 1994.

<sup>18</sup> Gerald W. Brock, “The Economics of Interconnection,” (prepared for Teleport Communications Group), April 1995, p. ii.

<sup>19</sup> *Price Structure Issues in Interconnection Fees*, p. 3.

<sup>20</sup> *EC Summary*, p. 103 (emphasis added).

Immediately preceding this part of the European Commission study, the authors emphasized that the issue of “contribution to overhead and common costs must be addressed as it affects the viability of the incumbent”:

“Whereas the entrant’s viability should, in general, not be increased by forcing the incumbent to provide interconnection below costs, the incumbent’s viability may legitimately have to be safeguarded through interconnection charges above costs. Such a mark-up would be in line with the Ramsey approach already described and would have to depend on the demand relationships, the state of competition, and the seriousness of financial shortfalls.”<sup>21</sup>

Indeed, the authors noted that “[i]nterconnection charges set at [long run average incremental cost] LRAIC would fail to provide contributions to the regulated firm’s truly common costs and other justified revenue requirements. Therefore, mark-ups on this cost standard should be allowed . . . .”<sup>22</sup> The authors also discuss the possibility that incumbent local exchange providers might, under certain conditions, merit receiving universal service funding upon the opening of the local exchange market to competition.<sup>23</sup>

In addition to their belief that interconnection prices and terms should be negotiated between and among carriers, the authors offer four main recommendations regarding interconnection pricing policy:

“From this we conclude:

1. The RA [regulatory authority] should not aim to impose interconnection charges that claim to correspond exactly to socially optimal prices.
2. The RA should define the lower and upper limits within which interconnection charges must be set.

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<sup>21</sup> *Ibid.* (emphasis added).

<sup>22</sup> *Id.*, p. 113. LRAIC means long run average incremental cost.

<sup>23</sup> *EC Summary*, p. 108.

3. The lower limit of an interconnection charge should be that of LRAIC.
4. The upper limit of an interconnection charge should be a charge calculated by adding to LRAIC a markup that, when applied to the LRAIC of each service, would lead to revenues sufficient to cover all revenue requirements (minimum uniform markup). [emphasis added]<sup>24</sup>

Thus, Dr. Brock is wrong in claiming that the EC Study “concludes” that interconnection charges should be based solely on “the incremental cost of capacity required by the interconnector.”<sup>25</sup> It does quite the opposite, recommending that interconnection prices also contribute to common and embedded costs of the incumbent carriers’ networks.

#### F. BROCK MISAPPLIES COST ESTIMATES OF THE MITCHELL/RAND STUDY

Dr. Brock has stated that a “sender keep all” compensation arrangement is appropriate “if either of two conditions are [*sic*] met”:

- (1) Traffic is approximately balanced in each direction; [or]
- (2) The actual costs are very low so that there is little difference between a cost based rate and a zero rate.<sup>26</sup>

Dr. Brock acknowledges that the first condition is “rarely” met and is certainly not met with the huge traffic imbalances between LECs and CMRS providers.<sup>27</sup> Nevertheless, Dr. Brock

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<sup>24</sup> EC Summary, p. 113.

<sup>25</sup> Gerald W. Brock, *Price Structure Issues in Interconnection Fees*, pp. 2-3. Prof. Brock repeats this mischaracterization in his paper, *The Economics of Interconnection*, undated, p. ii.

<sup>26</sup> Gerald W. Brock, *Incremental Cost of Local Usage*, (commissioned by Cox Enterprises) March 16, 1995, p. 1. See also Gerald W. Brock, *Price Structure Issues in Interconnection Fees*, (commissioned by Teleport Communications Group) March 30, 1995, pp. 3-4.

<sup>27</sup> See Gerald W. Brock, *Interconnection and Mutual Compensation With Partial Competition*, (commissioned by Comcast) undated, pp. 1 and 15.

asserts that his second condition is present because the cost a LEC incurs to terminate a CMRS call is so low that it is nearly zero. According to Dr. Brock, the cost a LEC incurs for "terminating traffic from a competitor is on average approximately 0.2 cents/minute."<sup>28</sup> Since Dr. Brock is mistaken about this second condition, as I demonstrate below, there is no factual foundation for his "sender keep all" recommendation.

Dr. Brock derives his "only 0.2 cents/minute" cost estimate using several faulty assumptions. First, he cites the European Commission study for the proposition that LECs should be entitled to recover only their incremental costs in their interconnection charges. But as documented above, this is a mischaracterization of the EC Study, which actually recommends that LECs must be able to recover other costs as well, including overhead, common, and universal service costs. LECs should also be allowed to recover legacy costs, i.e., the as-yet unrecovered costs of service obligations imposed by regulators, who require LECs to depreciate their assets at uneconomically slow rates.

Having incorrectly limited the LEC cost recovery issue to incremental costs, Dr. Brock then misuses the results of a RAND Study to conclude that a LEC's cost of terminating traffic from a CMRS network is nearly zero. The RAND Study examined the average incremental cost of capacity for local usage at the peak hour, limiting its investigation to large urban exchanges in California using digital technologies. The Study reported that the cost of a capacity increment that can handle one centricall second ("CCS") of traffic and its associated call attempts at the busy hour peak ranges between \$6.38 to \$12.13 for an "average urban" local exchange.<sup>29</sup> Dr. Brock spread this annual peak cost across all the traffic handled by the capacity increment, a

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<sup>28</sup> *Incremental Cost of Local Usage*, p. 1

<sup>29</sup> A centricall second ("CCS") is equivalent to 100 seconds of call time, i.e., 1.67 minutes.

practice he himself criticizes elsewhere in his paper.<sup>30</sup> Dr. Brock then derives the \$0.002 per minute cost estimate by taking the midpoint of the range,<sup>31</sup> and thereby concludes that a per-minute rate of \$0.002 is close enough to zero that free interconnection is appropriate — even among carriers with severe traffic imbalances.

There are several problems with Dr. Brock's analysis. First, the RAND study examined only incremental end office switching costs, which means he did not take other significant incremental costs into consideration, including tandem-level switching and transport. If he had included tandem switching in his computations, Dr. Brock would have obtained a per-call incremental cost of at least \$0.006 — a figure three times larger than his \$0.002 estimate.<sup>32</sup> Dr. Brock's omission of tandem switching costs is significant; within U S WEST's territory 92% of all terminating CMRS minutes pass through more than one U S WEST switch (Type 2A interconnection).

Second, the RAND study estimated the incremental costs of end office switching in large urban exchanges in California using digital technologies;<sup>33</sup> it did not attempt to evaluate analog

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<sup>30</sup> See Gerald W. Brock, *Incremental Cost of Local Usage*, (prepared for Cox Enterprises) March 16, 1995, p. 3, ("Because the [RAND Study] cost is determined by the use peak capacity, the actual cost per minute is much higher [than \$0.002] at the peak and is zero at the off-peak.").

<sup>31</sup> The \$.002 is obtained in the following manner. A capacity increment that can carry a maximum of 1 CCS during a busy hour could carry a theoretical maximum of 8,766 CCS per year (365.25 days/year x 24 hours/day). If capacity utilization is 33.3% (which Brock takes as an assumption) actual traffic is 2,919 CCS per year (=8,766 per year x 33.3%). This converts to 4,875 call minutes per year (2,919 CCS per year x 1.67 call minutes per CCS). The \$6.375 to \$12.125 incremental cost is divided by 4,875 annual call minutes for an average incremental cost per minute of \$.0013 - \$.0025. The midpoint used by Brock was \$.0019 per minute.

<sup>32</sup> The RAND Study estimated the incremental cost of one CCS of busy hour capacity for a local call switched through one tandem switch to be \$11 to \$30 per year — which, using Brock's questionable averaging technique, would result in an average per-call incremental cost of \$0.006.

<sup>33</sup> See Gerald W. Brock, *Incremental Cost of Local Usage*, (prepared for Cox Enterprises) March 16, 1995, pp. 1-2.

switches (like the large 1AESS) nor costs in suburban and rural exchanges.<sup>34</sup> Dr. Brock nevertheless assumes that costs in urban digital exchanges is the same as costs in analog urban exchanges and suburban and rural exchanges. This assumption is invalid.

Third, as Dr. Brock notes elsewhere in his very same paper, the incremental costs of the equipment studied is large at the peak hour and zero during non-peak times. By averaging the high peak costs over all minutes, Dr. Brock is able to obtain his "nearly zero" figure of \$0.002 and then conclude that all interconnections — including at the peak hour — should be free. Proposing an effective price of zero for CMRS interconnection during busy hours flies in the face of peak load pricing strategies which are used in a diverse array of industries from public transportation systems to electricity generation. Peak load pricing is even used by the cellular industry itself to ration scarce spectrum during busy weekday hours.

In summary, Dr. Brock's average cost estimate of \$0.002 grossly understates the incremental cost of Type 2A interconnection services typically used by CMRS carriers. He excluded important incremental costs incurred by LECs to terminate CMRS minutes, he did not examine the higher costs a LEC incurs with analog technologies or in non-urban exchanges, and he ignored altogether large classes of legitimate costs: common costs, overhead, and legacy costs. These omissions not only call into serious question his \$0.002 cost estimate, but also call into serious question whether "bill and keep" would be appropriate even under Dr. Brock's stated conditions.

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<sup>34</sup> U S WEST's urban/suburban/rural exchange mix in its 14-state service area is much different than Pacific Bell's urban/suburban/rural exchange mix in the State of California.



**G. POLICY RECOMMENDATIONS**

Based on the arguments presented above, the Commission should NOT adopt "bill and keep" or any other interim measure for CMRS interconnection. The FCC should honor the existing, negotiated agreements between LECs and CMRS which will provide adequate interconnection services for the next six months. Given the expressed Congressional preference for privately negotiated interconnection agreements embodied in the new telecommunications legislation, it would be particularly unwise for the Commission to overturn the existing interconnection agreements and impose new ones by regulatory fiat. The Commission should concentrate its scarce resources on the broader access charge reform proceeding and on developing a generic interconnection regime which will apply to all the different types of telecommunications carriers.

In these generic interconnection and access proceedings the Commission should establish rules which promote negotiated interconnection prices based on costs, with reasonable markups to contribute to common, embedded and universal service costs. Within that general framework, interconnecting carriers **can** then negotiate different interconnection arrangements and prices based on the costs, technology, and services being used, traffic volumes, the prices of the end-user services which are interconnected, and other market factors.